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SCIENCE AND TECHNOLOGY

No. 75

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WEST EUROPE REPORT

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CONTENTS

ELECTRONICS

France's Semiconductor Industry on Display at Exhibition
(ELEKTRO-ANGZEIGER, No 11, 1981) 1

ENERGY

EDF To Spend Over Hundred Million on New Energies
(AFP SCIENCES, 25 Jun 81) 5

EDF Says No More Themis-Type Power Plants in France
(SEMAINE DE L'ENERGIE, 22 Jun 81) 7

Unique Wind Turbine Exhibited, Now Operating
(Peter C. Reimers; FRANKFURTER ZEITUNG/BLICK DURCH
DIE WIRTSCHAFT, 9 Jun 81) 8

German-Argentine Wind-Energy Converter Operating
(A. Fritzsche; VDI NACHRICHTEN, 19 Jun 81) 10

Conference on Use of Wood for Energy Shows State of Art
(J. Nenin; INDUSTRIES & TECHNIQUES, 1 Jul 81) 15

Briefs

National Wind-Power Center 17

SCIENCE POLICY

New Research Minister Outlines Intentions
(AFP SCIENCES, 2 Jul 81) 18

Program To Be Set Up for Research, Technological Innovation
(AFP SCIENCES, 9 Jul 81) 20

TRANSPORTATION

Alcohol-Fueled Tractor Engine Ready To Be Marketed
(Pierre Bauchenot, Francois Gandouin; LE MATIN, 25 Aug 81) 22

Briefs
High-Speed Train Inauguration 24

ELECTRONICS

FRANCE'S SEMICONDUCTOR INDUSTRY ON DISPLAY AT EXHIBITION

Essen ELEKTRO-ANGZEIGER in German No 11, 1981 pp 5, 6, 8

[Article: "France's Semiconductor Takes Shape"]

> [Text] Over 95,000 visitors came to Paris to the "Salon International des Composants Electroniques 81." From April 6 to 11 they were able to peruse the components, instruments and manufacturing equipment of almost 1,700 exhibitors from 37 countries.

Over half of the exhibiting firms came from abroad. The largest contingent was provided by France with 682 exhibitors, followed by the U.S.A. (360), and FRT (185), Great Britain (128) and Switzerland (88). Also, 63 Japanese firms came to Paris; last year it was only 39.

In spite of the international participation, the primary value of the Component Salon is for the French industry. Exporting is becoming much more important than importing. Until now the predominant exports have been passive components and hybrid circuits. In recent years, with help from the French Government, a domestic semiconductor industry has been established which is now exerting considerable pressure on the European market.

Semiconductors from France

As at each electronics fair so also in Paris, the booths of the American semiconductor firms were centers of attention; however, this year there were no spectacular announcements.

Less noticed, but probably of considerably more importance for product improvements, are the activities of the French semiconductor firms. Since 1977 the French Government has fostered the development of an independent semiconductor industry. To date FF 600 million have been distributed to 5 firms: EFCIS, Eurotechnique, Matra-Harris, RIC and Thomson CSF. Only firms in which French companies are majority shareholders are supported; thus, Motorola in Toulouse and Texas Instruments near Nizza are not included in the support plan.

The Government support program is still in force, initially conceived to run until 1982; however, the French Minister of Industry Andre Giraud has announced that the program will extend beyond that date.

Within the scope of the effort to establish an independent microelectronics industry, two new companies were founded: Eurotechnique and Matra-Harris.

On 11 April 1979, Saint-Gobain-a Mousson and National Semiconductor signed an agreement of cooperation creating a new semiconductor manufacturer, Eurotechnique, with 51-percent holdings by the French company Saint-Gobain-a-Mousson and 49 percent by National. Within a period of 5 years, FF 400 million will be invested. The goal is MOS production, including NMOS and XMOS circuits and CMOS and P^{2}MOS components. In addition to memories and microprocessors, MOS circuits for the telecommunications and automobile industries are also planned.

The factory is located in Rousset-sur-Arc and presently employs 200 workers; by the end of 1984 this number will be 800. Production capacity is designed for a maximum of 50,000 silicon wafers; and the manufacturing equipment for 100-mm wafers can be converted to produce 125-mm wafers.

According to Eurotechnique's Application Manager Philip Maes: "The marketing strategy is to serve the broadest possible customer base across all of Europe." Eurotechnique will enter agreements with individual distributors as well as set up its own distribution network in the most important European countries. The French sales office was opened last year; distribution offices in Germany and Great Britain will be opened this year. The German distribution office, located in Munich, will employ 2 applications engineers.

The other newly founded firm is Matra-Harris which is owned 51-percent by the French concern Matra and 49-percent by Harris. It was officially established on September 6, 1979. Initially only CMOS circuits were manufactured; however, since the first of this year bipolar circuits, PROM's and IC's, for data communications are also produced.

In addition Matra-Harris concluded a second-source agreement with Intel on March 30. The first NMOS processors of the 8048 family will be manufactured in Nantes at the beginning of 1982. The agreement with Intel provides however for other processors as well. A common design center is also planned.

"Matra-Harris will also be active in the FRG," according to Marketing Manager Luc Joquet; negotiations with a distributor are almost complete.

In addition to a complete line of semiconductor memories, Matra-Harris also manufactures peripheral and interface circuits. Besides the 12-bit processor HM 6100, CMOS versions of the 8-bit /Kirdendall-effect/ controller 8048 will also be produced. The production program is rounded out with analogue components and IC's for telecommunications.

The two European semiconductor manufacturers still have to demonstrate how good they are, of course. The plan of the French Government to establish an independent microelectronics industry has been proceeding satisfactorily thus far.

Thomson and RTC

Somewhat longer in the semiconductor business have been Thomson CSF and RTC. Also, the Thomson subsidiary EFCIS has been producing microprocessors and other IC's for some time. All three companies received support money from the French Government.

At the Salon the Semiconductor Division of Thomson CSF announced a series of new products. In the area of bipolar IC's, mainly driver circuits and control components were introduced; in addition, several IC's for radio and TV equipment were presented. The Government is supporting this bipolar production with FF 100 million.

Thomson CSF still manufacturers mainly discrete semiconductors, concentrating on the strong sales area of power and signal components. Especially fast growth is anticipated in power semiconductors over the next few years.

The Thomson subsidiary EFCIS has a second-source agreement with Motorola. They have been building 8-bit processors for some time; now they are also manufacturing the 16-bit processor 68000. At the Components Salon EFCIS also introduced several interesting display processors.

The fifth and last firm supported by the Government is Radiotechnique Compelec (RTC). This Philips subsidiary manufactures primarily discrete semiconductors; however in Caen, integrated circuits are also produced--TTL/LS, CML and ECL as well as several linear circuits.

Among the discrete semiconductors RTC presented a LED made of GaAlAs.

Also shown were GaAs FET's and new optocouplers which are compatible with CMOS circuits.

Telecommunications

The French semiconductor industry has focused its effort on the development of circuits for the telecommunications industry. Four integrated circuits were developed by EFCIS and Eurotechnique and announced at the Components Salon. Simultaneously, it was announced that the two French companies have finalized an agreement with Harris and National Semiconductors concerning the production of these circuits. The integrated circuits involved are CODEC filters. These IC's will be deliverable in production quantities this year and in even greater numbers after 1982. Thus, worldwide standardized components from 4 different manufacturers are available, a development of great importance for the manufacturers of telecommunications equipment.

On almost all French booths the symbol of the European Quality Assurance System CEEC was to be seen. Yves Simmler President of the French Professional Association for Passive Components (SYCEP) lamented the fact that the German end users largely ignore the CEEC system. In his opinion this quality assurance system has several advantages compared to the American Military Specification System. The products are not only tested by the manufacturers but are also continually tested by independent surveillance centers. In many cases receiving inspection can be greatly simplified and made cheaper. Also, the products which fail the tests are publicized. But it is not just the users who profit by this quality assurance system; European component manufacturers also gain a competitive edge over their counterparts from the U.S.A. and Japan.

9160
CSO: 3102/387

ENERGY

EDF TO SPEND OVER HUNDRED MILLION ON NEW ENERGIES

Paris AFP SCIENCES in French 25 Jun 81 pp 3-4

[Text] PARIS--According to the management of the French Electric Company (EdF), this organization will spend, this year, 111.8 million francs for new energies. This amount breaks down into two categories:

- 84.4 million francs for new energies in the strict sense (solar, geothermal, wind energies)
- 27.4 for energy derivatives; that is, the use of thermal waste products, steam production, hydrogen.

More than 70 million francs will be used for two developments:

- the THEMIS solar power plant
- the Bouillante geothermal power plant in Guadeloupe

As for the other expenditures, emphasis will be placed on the very important research effort carried out in two areas:

- The mixed or joint production of heat for industry from nuclear power plants (from 2.4 to 13.2 million francs from 1979 to 1981),
- The use of solar energy in the industrial and agricultural (biomass) sectors, which has gone from 0.3 to 3.4 million francs from 1979 to 1981.

Expenditures by EDF for New Energies and Energy Derivatives

(in thousands of current francs)

		1979 Real Expenditures	1980 Probable Expenditures	1981 Anticipated Expenditures	%
I-	New Energies				
1-	Solar Energy				
	1.1 Use of solar energy in residential and tertiary sectors	4410	2535	2955	3.5
	1.2 Production of electricity from solar energy (basically project THEMIS)	14665	3400	57650	68.5
	1.3 Use of solar energy in the industrial and agricultural (biomass) sectors	335	1350	3400	4
2-	Geothermal Energy (Bouillante)	1700	2700	13700	16.5
3-	Wind Energy (Ouessant wind motor)	1400	1155	1800	2
4-	Energy Storage Except Hydraulic Storage	3200	1600	2200	2.5
5-	New Techniques for Using Fossil Fuels (Gasification...)	95	190	2680	3
	TOTALS	25805	12930	84405	100
II-	Energy Derivatives				
1-	Hot Water or Steam*				
	1.1 Recovery of low temperature thermal waste products from power plants (applications in agriculture, fisheries, and forest development)	6900	4330	7230	26.5
	1.2 Mixed or joint production of heat and electricity - transmission and distribution of heat - project studies	2415	3800	13240	48.5
2-	Hydrogen	4200	5200	6900	25
	TOTALS	13515	13300	27370	100

*Excludes applications of steam or hot water in industry but includes studies on supplying steam to industries.

9816
CSO: 3102/388

EDF SAYS NO MORE THEMIS-TYPE POWER PLANTS IN FRANCE

Paris SEMAINE DE L'ENERGIE in French 22 Jun 81 p 9

[Text] "EdF does not plan to construct any more Themis-type solar power plants in France--" was the declaration made last Thursday by Mr Marcel Sagot, regional director of EdF's Alpes-Marseille equipment region.

"As long as we don't know how to concentrate the diffused energy, this technology costs much too much," he stated during his Thursday visit to the plant site at Targasone (Pyrenees-Orientales). "The basic cost comparisons are unsatisfactory. Given current economic conditions, Themis-type solar power plants cannot constitute a basic energy source for France. Right now, a KWh costs 5 francs, compared to 15 centimes for nuclear, 42 centimes for those run on coal-burning power plants, and 47 centimes for those run on fuel oil."

Themis is a solar power plant with a tower and a power output of 2,500 KW. A field of 200 heliostats (large mirrors) focuses solar rays onto the boiler located at the top of a tower. The heat collected in this way is converted into electricity by a water-steam cycle which runs a standard turbo-alternator unit.

Work on Themis began in October 1977 at the Targasone site, which has an altitude of 1700 meters and was chosen because of its exceptional amount of sunlight (2400 hours/year); the project will be completed in November 1981. The investment runs to more than 128 million francs and is shared as follows: 13 percent jointly by the Department of the Pyrenees-Orientales and the Languedoc-Rousillon region, 39 percent by the Solar Energy Commission, and 48 percent by the French Electric Company. At EdF, there is no great enthusiasm for this sort of operation in France. When it's connected to the grid, the sale of the 3 million KWh currently produced won't even cover the salaries of the people allocated to run it.

The plant could be much more profitable in warmer regions, especially in Central Africa and Australia. Thus Themis, an expensive item in France, could find a better market through export.

9816
CSO: 3102/388

UNIQUE WIND TURBINE EXHIBITED, NOW OPERATING

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 9 Jun 81 pp 415-416

[Article by Peter C. Reimers]

[Text] At the 1981 Hannover Fair, there was the first showing of a large wind turbine which is supposed to ensure an economical generation of electricity through its extremely high rotary speed. This unit, the only one of its kind in the world, was installed after the fair on a tubular steel tower 30 meters high near Stoetten in the Swabian Mountains (Figure 3).

The Voith Wind-energy Converter WEC 300 starts up even at wind velocities below 3 m/s, and from 4.5 m/s on it begins to deliver electric power. The full power of 316 kW is reached at 8.5 m/s. In a storm, the unit shuts off (runs on "sailing" mode) so that no damage can occur. Since with this turbine economical results can be achieved even at relatively small wind velocities, its use is feasible also in regions which do not offer such optimal conditions as are found along the coast or in the mountains.

The attempts made up to now to convert wind energy into electric power have led chiefly to rather small units. Wind turbines with installed capacities up to the 10-kW range are to be found again and again on the market--and larger units are being planned and developed. The Voith Wind-energy Converter WEC 300, with commercially reasonable dimensions, is the first such turbine of this size to be equal to the requirements made with respect to running characteristics, self-regulation, and efficiency. Its electric power (380 V, 50 Hz, three-phase current) is so constant in terms of voltage and frequency that it can be fed directly into the distribution network of the relevant electricity supply company, a step which has already been authorized.

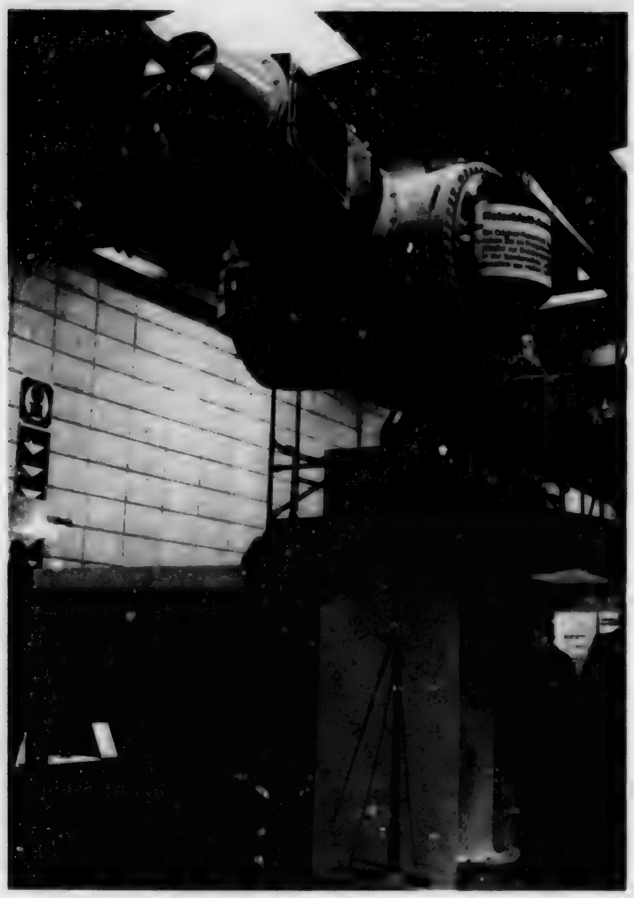

Figure 3. Nose, 12 tons in weight, of the new Voith Wind Turbine. To this "nacelle" is attached the two-bladed rotor, which has a total length of 52 meters. The solar cells which supply the unit's measuring equipment with electricity can be seen clearly. The complete large turbine set-up is shown in the illustration.

12114
CSO: 3102/360

GERMAN-ARGENTINE WIND-ENERGY CONVERTER OPERATING

Duesseldorf VDI NACHRICHTEN in German 19 Jun 81 p 28

[Article by A. Fritzsche]

[Text] On the coast of Patagonia, one of the most windy regions in the world, a 20-kW wind-energy converter with a vertical rotational axis (Darrieus design) was placed into operation around the middle of April. On the German side, the work for this German-Argentine joint project is being performed by order of the federal minister for research and technology (Identification Number ET 4403-A).

On 14 April, a wind-energy converter with a vertical rotational axis, built in accordance with the Darrieus principle and with 20 kW of rated electrical output, rotated for the first time on the South American continent. The site lies on the airport grounds of Comodoro Rivadavia, a city in Patagonia, 1,600 km south of Buenos Aires. Following the preliminary work by the Argentine partner--design and construction of the foundations, laying of the underground connections, setting up of the power sink and wind-measuring equipment--only 4 days of joint work were needed for the final assembly of the mechanical and electrical components.

At first the completion of the facility and the functional testing were delayed by a sandstorm, heavy rainfall, and then by windlessness. Neverthelesss, by 21 April the complete demonstration of the mechanical and electrical functioning of the facility in the entire operational range could be given and the facility could be turned over to testing. Initial test runs under varying wind conditions lasting several days showed that the facility--as was calculated--starts to operate at only 4 m/s and that the rated electric power exceeds the design value by about 10 percent.

At the end of 1978, within the framework of German-Argentine agreements on carrying out joint research and development projects, Dornier System of Friedrichshafen was directed by the federal minister for research and technology to start on the development and manufacturing of a wind-energy converter having 20 kW of rated power, a rotor diameter of 12 m, and a vertical axis of rotation. This work was based on design and computational data from a previous project involving the construction of a wind-energy converter with a rotor diameter of 5.5 m.

Fundamental Data of the Facility

Rotor diameter	12 m
Total height of the facility	17.5 m
Effective rotor surface area	93 m^2
Blade coefficient (profile NACE 0015)	3 m
Profile depth	320 mm
Start-up wind velocity	4 m/s
Nominal wind velocity	10 m/s
Shut-off wind velocity	22 m/s
Survival velocity	65 m/s
Nominal rotational speed	70 rpm
Maximum rotational speed	150 rpm
Rated power, electric	20 kW
Maximum power, electric	25 kW

The division of labor was such that the Argentine partner, the Comision Nacional de Investigaciones Espaciales (CNIE), Buenos Aires, undertook the determination of wind conditions in the area of the selected site and the general supervision, so that by and large all the manufacturing methods employed in the construction of the facility can be executed later by Argentine industrial outfits as well. Through the collaboration of Argentine engineers in the project on the premises of Dornier System, an almost problem-free site preparation (foundation laying and wind-measuring equipment) and a rapid final assembly was ensured, and preparations were made for the testing phase, in which the German side will take part only in a supporting role.

The Institute for Climatology and Meteorology at the University of Hannover analyzed the wide-ranging meteorological conditions of Argentina, analyzing in particular depth the southern portion of the country and the site of the facility. This investigation is in the nature of a model which will form the basis for further projects.

It is the goal of this project to test the technology of a wind-energy converter with a vertical rotational axis in a power range which lies above that of commercially available small facilities, allowing it to make a substantial contribution to the energy supply for autonomous consumers in windy regions. On the socioeconomic plane, this bilateral project fits into national Argentine programs for the long-range improvement on a broad basis of the structural situation of the southern part of the country, to be accomplished with the support of German technology.

Lightweight Blade Construction

As part of the development program of the Federal Ministry for Research and Technology, this project does much to foster the trend of using wind-energy converters with a vertical rotational axis in the domain of small outputs--a development which is very important as well to the national wind programs of the United States, Canada, Sweden, Great Britain, and the Netherlands, which involve large facilities up to the MW range.

As a result of its characteristic of having a vertical rotational axis, as compared to the familiar wind-energy converters with a horizontal rotational axis, the functioning of this facility is independent of wind direction. Initial test results on large American units with a horizontal rotational axis have shown that the cumulative effect of their imperfect adjustments to the momentary wind direction is definitely not irrelevant in terms of energy loss. The Darrieus rotor (3 blades) runs in an upper and lower bearing.

The upper bearing and thus the rotor itself is held in place by three guy ropes anchored to the ground. In order to ensure pre-tensioning, prestretched solid material was selected. The rotor blades, designed to form a symmetrical aerodynamic profile, were extruded from an aluminum alloy (AlMgSi) and bent in a blade shape which corresponds to the jump-rope curve (troposkiene). This shape allows a particularly lightweight blade design, since the bending forces are reduced to a minimum. The attachment of the blades to the rotating tower at the top and bottom is rigid in the circumferential direction, so that the torque can be transmitted, and flexible in the plane of the blade in order to offset the bending stresses. For reasons of ease of transport and assembly, each rotor blade consists of three sections, which are connected together in the final assembly at the erection site by means of bolts.

In order to limit the rotational speed of the rotor, spoilers were incorporated in each rotor blade as aerodynamic brakes. They lie in the equatorial plane of the rotor, since their effect is greatest here. The spring pre-tensioning of the spoilers is adjusted in such a way that from about 100 rpm on, they begin to depart from their zero position through centrifugal force, thus generating the aerodynamic resistance.

The start-up of the Darrieus rotor, whose blades need not be altered in their angle of pitch, can be achieved by aerodynamic or electric means. For the facility at Comodoro Rivadavia, two Savonius rotors were chosen which are positioned in an aerodynamically favorable way at the upper and lower zones of the rotor. With a three-bladed design for the Savonius rotor, and moreover with the second being twisted by 60°, the greatest possible uniformity in the start-up torque is achieved for every wind direction. Wind-tunnel tests with a smaller rotor have shown that within the range of measurement accuracy, no detectable loss of power of the Darrieus rotors due to the Savonius rotors could be found.

The tower is an aluminum tube (AlMg 3) which is 12 meters long and which is spiral welded in one piece. Relatively large numbers of these structural units are used in process engineering. By way of the lower rotor bearing, the base structure absorbs the forces which result from the rotor weight and the guy ropes. Moreover, it also serves as a protective housing for the components of the energy transfer, such as brakes, drive shaft, coupling, gear unit, generator, and control and monitoring units.

The electrical concept is based on the consideration that the maximum energy is utilized when--regardless of the wind velocity--the system is run within the operating range at an optimal total efficiency at all times. Since depending on the wind velocity the maximum efficiency, and thus also the appropriate output, is found at differing rotational speeds, the characteristic of the generator must be shifted for an optimal matching of maximum to maximum. The functioning of this peak-value controlling lies in the fact that the energizing of the generator is chosen automatically in such a way that this generator furnishes a maximum current. Via a rectifier on the output side, the synchronous generator--which is coupled to the rotor by way of a gear unit which has a fixed gear ratio--lies at the relatively constant potential of a battery. The peak-value controller continually superimposes on the basic excitation current a small amplitude of low frequency. Through its modulating of the generator speed, this modulation of the excitation current causes a modulation of the power output. The matching accuracy is within about 1 percent of the actual instantaneous maximum. The battery is designed only for the floating operation of brief power fluctuations. A standard line voltage (380/220 V/3 phase/50 Hz) is generated by a static converter. In the initial development stage, the energy is supplied to a lighting and heating system. The equipment for the control, energy processing, data logging, and monitoring are housed in a dust-proof container.

Although it only proved possible to extract the energy supplied by the facility to the nominal operating point by means of the parallel operation of battery charging and the sink--an increase in power would have been possible by using a larger sink--the entire operating range could be gone through several times in association with important operational situations. A wind velocity of 4 m/s is sufficient to cause the rotor to start up with disengaged coupling, and an only somewhat greater velocity is needed when the gear unit and generator are connected in. At a rotational speed of about 40 rpm, the generator begins to deliver energy, and at 70 rpm the rated power is reached.

The portion of the data initially evaluated showed that the band of measuring points follows the maxima of the calculated characteristic curves. The coordinating of output and wind velocity will remain problematic even with this still relatively small facility, although gusts were observed which increased the rotor speed even though they did not perceptibly register on the anemometer. The maximum value of 65 m/s given by the weather service for this site was taken as a basis in the design as the survival velocity for the facility. During the assembly, velocities of 120 km/hour or 33 m/s occurred, and these are not considered unusual.

Spoilers Brake the Speed

The coincidence of the calculated critical rotational speeds with the observed occurrence of very weak oscillations of the guy ropes below the operating point is one of the pleasant surprises in view of several problems discussed in the technical literature. At about 90 rpm, all the spoilers begin to open evenly. In the load-free run-up curve, the drop in the increase of rotational speed is clearly recognizable. As a redundant speed limiter and stopping brake, at 120 rpm an electro-hydraulically driven disk brake engages, which brings the rotor to a stop within 15 seconds, inclusive of reaction time. Perhaps certain adjustments may still have to be made in connection with the controller setting, so as to match the time constant of power maximization with the dynamic behavior of the rotor.

The Argentine partner CNIE will install an automatic recording device for the operational and meteorological data and will improve the utilization of the electric power in a way appropriate to the quality provided by the facility. According to the planning of the project, the testing phase will run until February 1982, from which both partners expect extensive data, which will be important to the continuation of development in this sector.

12114
CSO: 3102/360

ENERGY

CONFERENCE ON USE OF WOOD FOR ENERGY SHOWS STATE OF ART

Paris INDUSTRIES & TECHNIQUES in French 1 Jul 81 p 12

[Article by J. Nenin]

[Text] Gasification, hydrolysis, chemical extraction, a thousand and one methods are available to process wood and wood by-products. Specialists met in Bordeaux to review the situation.

In the area of wood, France has an enviable position. Forests cover 13.5 billion hectares of the nation's territory, or 45 percent of the total wooded area for all countries in the EEC (European Economic Community). Both from the raw materials and from the energy standpoint, this recently "re-discovered" natural resource represents a much greater wealth than its conventional uses had led to believe. From the energy standpoint, one ton of wood is equivalent to 313 liters of fuel oil. It is therefore anticipated that by 1985, wood will provide 2.5 million tons of petroleum equivalent which will be added to the 2 million tep already produced. By itself, the use of wood by-products and residues offers a wide choice of possibilities. The production of lumber for construction produces a large amount of residues, about 40 percent.

In order to review the status of these possibilities, the Association for the Promotion of Research and Innovation in Industry has just organized, with the assistance of the Chamber of Commerce and Industry of Bordeaux and the Landes Region, a one-day meeting with the object of reviewing the "utilization of wood by-products and residues." About 80 specialists attended.

Wood gasification is a popular subject. The Battelle Institute has just completed the development of a double fluidized bed prototype. Along the same lines, Mr Chrysostome, of Creusot-Loire, presented an experimental gas generator for the production of methanol. Its fluidized bed consists of sand with grain diameter between .5 and 2 mm. The cylindrical device has a .20 m radius and is 4 m high. Wood pyrolysis is performed at 800 to 1000°C and the resulting tar is immediately cracked and gasified by churning with oxygen under a pressure of 10 to 30 bar. Methanol synthesis is performed using a catalyst after purifying the gas and adjusting its composition (the molecular ratio of hydrogen to carbon monoxyde must be equal to 2). Since the transformation is not yet complete then, the synthesized gas is recycled after having recovered the methanol already produced. On his part Mr Molle, of CEMAGREF, mentioned that a method for the heating of private residences is being developed at the National Center for Study and Experimentation of Agricultural Machinery. It consists in producting gas from wood or straw in a small, automatically-fed gas generator. The gas produced in this manner is then burned using a special burner, inside the existing oil or gas furnace. This considerably reduces the initial investment. He also mentioned the appearance of new carbonization techniques applicable to products not previously concerned by this transformation method, such as sawdust and straw. Since these products consist of smaller pieces than the usual wood logs, they do not allow circulation of the hot carbonization gases as in conventional methods.

In the area of hydrolysis of ligneous and cellulosic products Mr Raymond, of Bertin Company showed that the best method consists in selecting a low-cost raw material (such as residue), and in concentrating the R & D effort on improving these methods. With this objective in mind, his company has made the proposal to the Ministry of Industry to build a pilot installation. The method used would be hydrolysis using diluted sulfuric acid under high pressure and temperature applied to ligneous and cellulosic products such as wood, straw, corn stalks, etc. Sugar-bearing juices obtained would be used for the production of gasohol by acetonobutylic fermentation, of chemical ethanol by ethylic fermentation, and other compounds.

For Mr Pommier, Director of the Pine Industry, the analysis of the different compounds which can be extracted from pine bark shows the richness of this residue in phenolic products. These products represent 40 percent of the total bark weight and can be easily extracted using soda at 1 percent concentration. From the mixture obtained, it is possible to extract formo-phenolic resins which have an immediate outlet, particularly in the production of adhesives (plywood, pressboard, etc.)

Wood residues may be used in the wood industry itself, particularly as construction lumber. Mr Mercier, an Engineer at the GREF, has conceived a modular dryer for the Monts de la Gresigne Sawmill (Tarn). The device has a capacity of 200 m3 of wood logs (to dry 1,000 m3 a year) and will operate using 50 tons of dry sawdust. The additional energy required (about 50 percent) will be provided by integrated solar heaters located in the walls and roof of the building. This system will compete not only with oil and gas drying, but also with the compression heat pump which was considered the most satisfactory solution until now.

As Mr Leonard, of the Pine Cellulose Company state, nothing should be neglected. Along with other concerns, his company has been participating since 1975 in studies on the recovery of stumps of Maritime Pine in timber land. They have just demonstrated that stumps are one of the most accessible resources offered by woodlands, particularly for the production of pulp. This is especially interesting since stumps constitute obstacles which appreciably increase the cost of reseeding (by at least one third). Finally, Mr Lebesgue, of Multibio Company, has underlined the interest presented by some wood residues and by-products in the production of compost (a fertilizer which accelerates growth in some species). A return to the source, in other words.

6445
CSO: 3102/390

ENERGY

BRIEFS

NATIONAL WIND-POWER CENTER--Lannion - Creation of a wind-power center in Lannion - The city of Lannion (Cotes-du-Nord) has been chosen by the Solar Energy Commission as the site of a national wind-power center, it was learned from generally well-informed sources in Lannion. The center will be available to industries and development labs. The mayor, Mr Jagoret, was notified the previous day by the Commission. The exact site has not yet been officially selected but, according to well-informed sources, could be on the coast in the area of Trebeurden. The geographical location of the city and its favorable industrial environment were emphasized when the city presented its candidacy. [Text] [Paris AFP SCIENCES in French 2 Jul 81 p 38] 6445

CSO: 3102/390

SCIENCE POLICY

NEW RESEARCH MINISTER OUTLINES INTENTIONS

Paris AFP SCIENCES in French 2 Jul 81 pp 1-3

[Text] Paris -- The government will undertake "an unprecedented effort" in scientific and technological research, emphasizes Mr. Jean-Pierre Chevenement, minister of state, minister of scientific and technological research, in an interview granted to the French News Agency.

In order to attain the goal of raising national research and development expenditures (DNRD) to 2.5 percent of the GNP (gross national product) in 1985, 80 billion francs (in constant francs, and taking all expenditures together: public and private, civil and military) should be dedicated, in that year, to scientific and technological research. This figure was around 50 billion in 1980.

This effort cannot be successful without the "active participation" of private enterprise which, today, accounts for 40 percent of the total expenditures. "The great majority of businesses, which will remain private, will have to make a significant effort in the area of applied and technological research," judges Mr. Chevenement.

"To that end,"explains the Minister,"the project carried out by the regionalized ANVAR (National Agency for the Valorization of Research) must be continued and intensified, whether it means aids to innovation, subsidies for innovation, or new procedures to be perfected. I'm also thinking about reduced loans, specially reserved for research and development investments."

Will private enterprise follow that policy?

"Let me point out," responds Mr. Chevenement in that regard, "that of the 22 billion francs which the business sector spent in 1980 on research and development, more than 12 billion francs were advanced by businesses which are today on the list of organizations to be nationalized. By itself, the Thomson group devoted more than 3 billion to research and development, which places it at the head of private businesses."

The scientific community, on one hand, and Parliament, on the other, "will be closely associated with the great scientific and technological choices which the government will make," Mr. Chevenement is quick to stress. That's why a great national conference will be held in the fall to discuss those choices. The organization committee of this conference will be formed in the near future. The scientific program law will be submitted for examination by the deputies in 1982, so that it may take effect in 1983.

On the controversial problem of guardianship of the great research organizations (that is, to which ministries, on the basis of their missions, should these organizations be attached), Mr. Chevenement explains that "the decree for allocating these guardianships has already been approved by the Council of Ministers. It's a matter of days before it appears in the official Journal."

"The decree states that the total credits authorized for research and technological development organizations will be part of my ministry's budget package. As important as this arrangement may be, it still leaves open the question of the guardianship's administrative organization."

"My philosophy is simple," declares the Minister on this point. "You have to encourage every useful relationship; in short, cover the territory and choose the solutions best suited to each of the organizations."

And to illustrate a specific case, the ARIANE program, which features the pre-emminent National Center for Space Studies (CNES), Mr. Chevenement answers in regard to the decision which must be made about ARIANE-4 (a launcher twice as good as the one just launched successfully at Kourou): "The Council of Ministers has already favorably considered the subsequent development of the ARIANE program. Soon, I intend to submit the file on the development of the ARIANE series. It is fitting, it seems to me, that the decision be made next at the governmental level, either a council at the Elysee palace, or in an interministerial committee.

On the international scene, Mr. Chevenement believes that cooperation must be increased and, in particular, in European countries themselves, where there is a vast area ready for this cooperation.

"I'm planning to meet very soon with my counterpart of the Federal Republic of Germany, Mr. von Bulow, and I intend to make a complete review of all the possibilities which are available for strengthening the already close ties which exist between the two countries in scientific and technical matters."

As for the developing countries, Mr. Chevenement considers that "there you have an important aspect of our policy which must be one of scientific research which is capable of responding to the problems encountered in France and the developed countries (such as the energy crisis, the competitiveness of businesses, the changing of work conditions, public health policy, etc....), but which takes into account the needs of the developing countries. What I have in mind is solar energy, fisheries, agronomy, bio-technologies, telecommunication satellites."

"Generally speaking, it's a question of making available to those countries the knowledge potential accumulated in the great industrial centers: in the United States, Europe, Japan, and the Soviet Union. For historical and geopolitical reasons, Europe has a stake in this, and its mission is to develop a grand strategy to make available the knowledge and technological potential built up in Europe over several centuries, often -- we should remember -- at the cost of exploiting other regions of the world."

To the last question: Will you have the political authority to act, because there are numerous precedents of promises which were not kept?, Mr. Chevenement answered: "If Francois Mitterrand did me the honor of entrusting me with responsibility for this sector, it's undoubtedly because he considered scientific research to be too serious a matter to be entrusted to anyone other than a politician."

9816
CSO: 3102/391

PROGRAM TO BE SET UP FOR RESEARCH, TECHNOLOGICAL INNOVATION

Paris AFP SCIENCES in French 9 Jul 81 pp 1-2

[Text] Paris. A multi-phased program of laws for technological research and innovation. In his programmatic speech delivered on 8 July to the National Assembly, the prime minister, Pierre Mauroy, confirmed that a multi-phased program of laws for technological research and innovation would be introduced in spring 1982. That same day, having been invited to a luncheon of the Scientific Journalists Press Information Association (AJSPI), Jean-Pierre Chevenement, secretary of state and minister of scientific research and technology, provided fuller information on what he had already said, elsewhere and on an earlier occasion (see the AFP-Sciences issues since No. 264 of 27 May 1981).

This multi-phased program of laws will be closely incorporated with the 5 year plan envisaged for the years 1984-88, but a certain number of measures in keeping with the program will appear already in the general provisional plan (and even in the extraordinary credits of the national budget which will be voted on as early as this session of the Assembly) which the government will apply to the 1982-83 period.

The program of laws which, apparently, will include seven categories, will define on the one hand the government's general strategy for ensuring that the national research and development effort reaches 2.5 percent of the PIB [Gross Domestic Product] towards 1985, and on the other hand will determine the principal scientific options and technological choices which command the future, and also the means for arriving at them.

One may say that among the seven categories one will find in one form or another the 10 topics which will be discussed during the national conference on research and technology which will be held about 15 Jan 1982, i.e., after the fall session of Parliament.

The major topics--it is still a matter of an outline whose contents and definitive structure will be determined in the coming weeks--are the following:

1. The scientific options and technological choices which command the future.

2. Technological and scientific research and a new development model.
3. Institutions; the organization of research and technology in France.
4. Industrial research.
5. Research, technology, and major operations finalized.
6. Research and major operations finalized.
7. Scientific employment policy.
8. Means of implementation.
9. Research and communications; scientific information, research, Parliament, and public opinion.
10. Science and ethics, the responsibility of the scientist.

Chevenement stressed that this national conference must come up with concrete propositions concerning:

--the major objectives to be reached,
--realization programs,
--courses of action for the minister of research and technology, organizations, and the leading participants in research,
--institutional innovations.

The organizational committee of the conference--presided over by Francois Gros, head of the Institut Pasteur [Pasteur Institute], charged with representation to the prime minister--together with the rapporteurs should be set up between now and 16 July. The orientation document of the conference will be ready by the end of July. It will be widely distributed beginning 1 September, concurrent with the setting up of the organizational committees of the regional assizes which will precede the conference, so as to allow the broadest participation of the scientific community and of the different socio-economic partners in preparation for the conference.

These regional assizes are planned for 1 October to 15 November 1981. It is to be noted that a secretary for each of these assizes will be chosen from the regional correspondents of the DGRST [General Directorate for Scientific and Technical Research], the regional delegates of ANVAR, [National Association for the Valorisation of Research] or noted scientists.

9824
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ALCOHOL-FUELED TRACTOR ENGINE READY TO BE MARKETED

Paris LE MATIN in French 25 Aug 81 p 18

[Article by Pierre Bauchenot and Francois Gandouin: "The Alcohol-Fueled Motor Enters the Campaign"]

[Excerpts] What could be more commonplace than a tractor, in a field, on a summer day? And yet, the tractor being developed, proudly and at the same time anxiously, by Georges Agache, its inventor, is not an ordinary tractor. Under its gleaming frame, the good old standard diesel has been replaced by a single cylinder, 25 hp motor running on alcohol. It makes the same noise and is used for the same things, but with its single cylinder, this new motor, according to its builders, develops as much power as the original standard two-cylinder motor and has an equivalent thermal efficiency. In practical terms, this motor, which is smaller and lighter than its competitors, ought to consume less energy to produce the same amount of power. It has an advantage which is not yet proven but which will eventually be decisive; it runs on alcohol. Ethanol, with a sugar base (beet or cane) and methanol produced from biomass and coal are forms of industrial alcohol, which is easy to produce, especially for a large agricultural country. This has been a constant preoccupation of the Germans, and the Brazilians are already widely using alcohol from sugar cane. But the procedure developed by Volkswagen-Brazil is a compromise; the motors which they use still need gasoline, at least for starting. Georges Agache's motor is designed to run exclusively on alcohol. Neither a far-fetched gadget nor the invention of the century, the Moteurgaro does not claim to revolutionize the world's economy. But it can be one of several ways to respond to the energy challenge. The product of 30 years of passionate work, it is an interesting example of innovation and cooperative planning in the French style.

Neither a diesel nor a conventional motor, the Moteurgaro is a new system developed from existing blocks, and designed to use either ethanol or methanol. Made one at a time, it would cost up to 10,000 francs. But mass production could bring the cost down to the neighborhood of 1,000 francs. The problem is the supply of basic machinery available on the national market. There are virtually no French manufacturers of farm or industrial diesels. Out of 70,000 such motors sold each year, scarcely a thousand come from French factories. Even Renault tractors are equipped with German mechanisms. Agache and Chenesseau do some work on Alsthom motors (one of them was exhibited at the Inova show, last April). But they concentrate on German, English, or American motors. "As for our being able to produce the entire motor block by ourselves, that's a task which far exceeds our financial capabilities, explains Jean-Paul Chenesseau. Right now, we've got to be satisfied with conversion. The program is going well. I saw the first motor run last September, and we'll be able to meet the demand on a regular basis at the end of the year." As a matter of fact, the first tractor has just been sent to Mali for testing.

If it performs successfully, a hundred or so machines could be ordered quickly. One reason is that Mali, economically strangled by the increase in oil prices, has a compensatingly large surplus of ethanol production. The third world obviously constitutes a natural market for the alcohol motor. Another reason is that agricultural waste and all the by-products of biomass make it possible to obtain fuel from decentralized sources and cheaper than imported oil. Numerous countries are interested in this type of fuel. India is especially interested, because renewable energy obtained from biomass requires both simplicity of technique and abundant manpower.

In the industrialized countries, the problem takes a different form. It's hard to imagine that alcohol will be used anytime soon for private cars. To do that, service stations would have to be specially equipped, and in France there are no fewer than 10,000 selling locations. Therefore, in the near future, alcohol can be used only for "captive fleets": taxis, mass transit, industrial vehicles, which can return for refueling at a small number of distribution points. But, obviously, the most important use of the alcohol motor is in agriculture. It's in the fields, where biomass can easily be converted to energy, that this type of propulsion can immediately be turned to profit. It could also be one answer to the difficulties of farmers who are directly hit by the price hike in petroleum products. Out of 100 million tons of oil imported by France each year, 20 million are used to satisfy transportation needs, of all sorts; and out of those 20 million, a good third is used by agriculture. Someday, perhaps, alcohol will, at least to some degree, take the place of the gasoline or the fuel oil burned in tractors and combines. Coastal fishing could also benefit from this type of propulsion, because algae constitute a good raw material for producing methanol.

The team of Agache and Chenesseau has no dearth of ideas for finding markets for alcohol motors. But at present there is a serious obstacle to mass producing them; compared to the potential demand, there is an almost complete lack of industrial capacity to produce industrial alcohol in France. The reason is that transportation is still in an "oil for everything" status. Indeed, it is against the law to put anything else in your gas tank, with one exception, up to now, for the LPG (liquified petroleum gas) parsimoniously distributed in the South-West. At the beginning of 1981, Andre Giraud, then Minister of Industry, launched the "Carburol plan." It's goal was gradually to put on the market a mixture of 90 percent gasoline and 10 percent alcohol, for use in automobiles.

This was an effort which, when fully implemented, would save around 1 million tons of oil, which is 1 percent of our petroleum production. More intensive use of industrial alcohol as fuel would undoubtedly be rather costly, at least at first, since considerable investments would have to be amortized. But greater use would lead to savings in foreign exchange and would enhance the nation's energy independence. We're not quite there yet. And the development and use of alcohol require at the same time a political will and favorable economic conditions. For a long time, the alcohol motor project remained tucked away in a drawer, because there wasn't any fuel. And alcohol wasn't produced because there weren't any motors adapted to use it. It was difficult to get out of this vicious circle. A first step has just been taken.

9816
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TRANSPORTATION

BRIEFS

HIGH-SPEED TRAIN INAUGURATION--Dijon. Official inauguration date of the TGV. The official inauguration of the high-speed train (TGV), scheduled to go into service 27 September, will take place a few days before that date at the new Montchanin station (Saone-et-Loire), in the presence of Francois Mitterrand, it was learned 6 July from informed sources. The exact date has not yet been finalised but a 23 September date was proposed, indicate the same sources. The president of the republic will travel in the TGV from Paris to Montchanin. After this inauguration, other ceremonies will take place in the principal stations served by the new train. The TGV will link Paris to Lyon, Marseille, Switzerland, the Alps and Languedoc in less time than the usual trains, but will only travel at maximum capability (260 km.p.h.) by September 1983, when the St-Florentin (Yonne) Combs-la-Ville (Seine-et-Marne) section of the new Paris-Lyon line will be completed. The journeys at that time will be accomplished notably in 2 hours between Paris and Lyon (3 hours 48 minutes now) and in 4 hours 43 minutes between Paris and Marseille (as against 7 hours and 5 minutes). [Paris AFP SCIENCES in French 9 Jul 81 pp 14-15] 9824

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